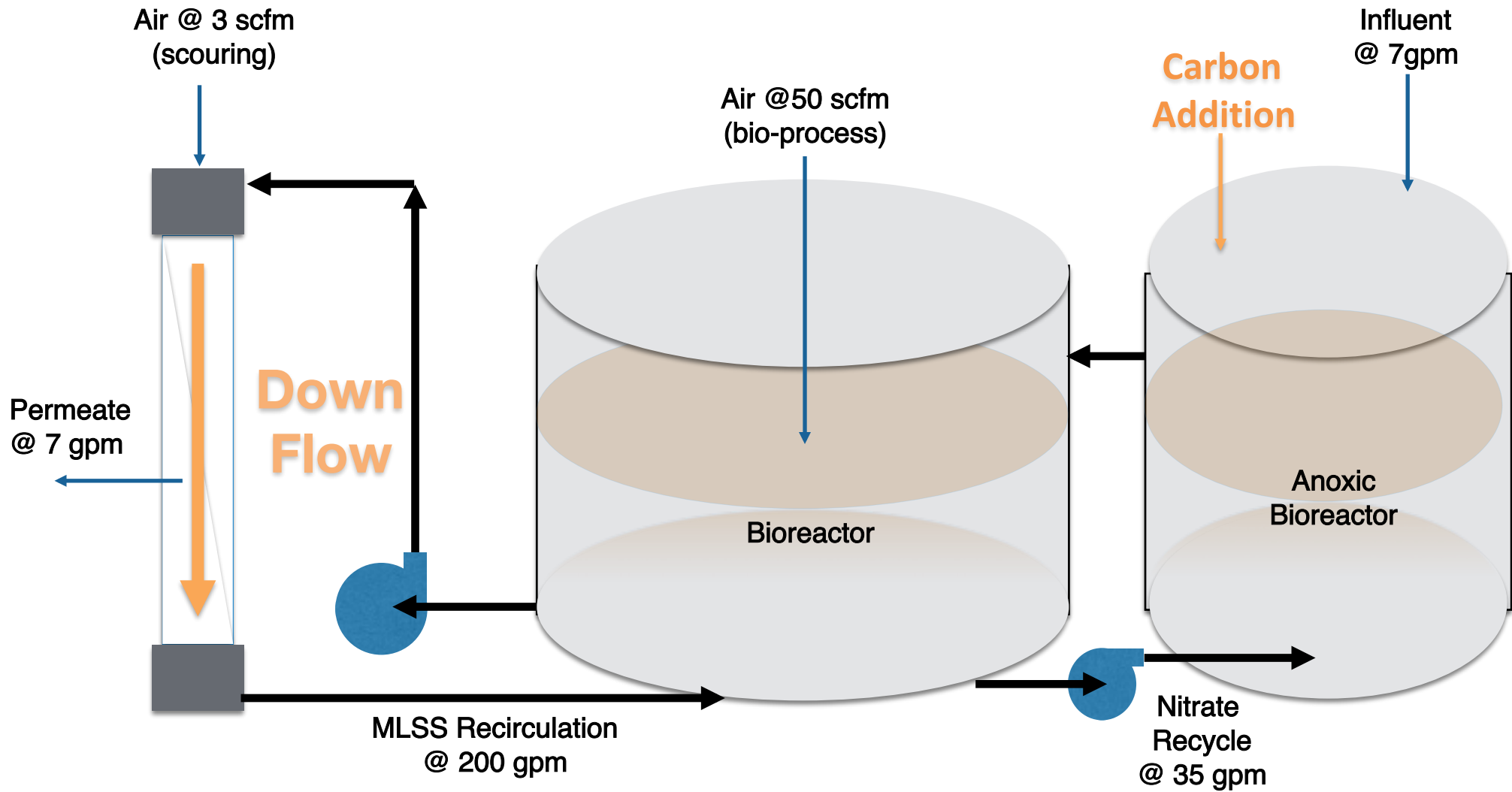


# Optimized Nutrient Removal Process and Control for Small Flow MBR WWTP's

Presented by:  
Robert A. Kershner  
President  
Innovative Treatment Products, LLC



## miniMBR® - 10,000 gpd MBR Example

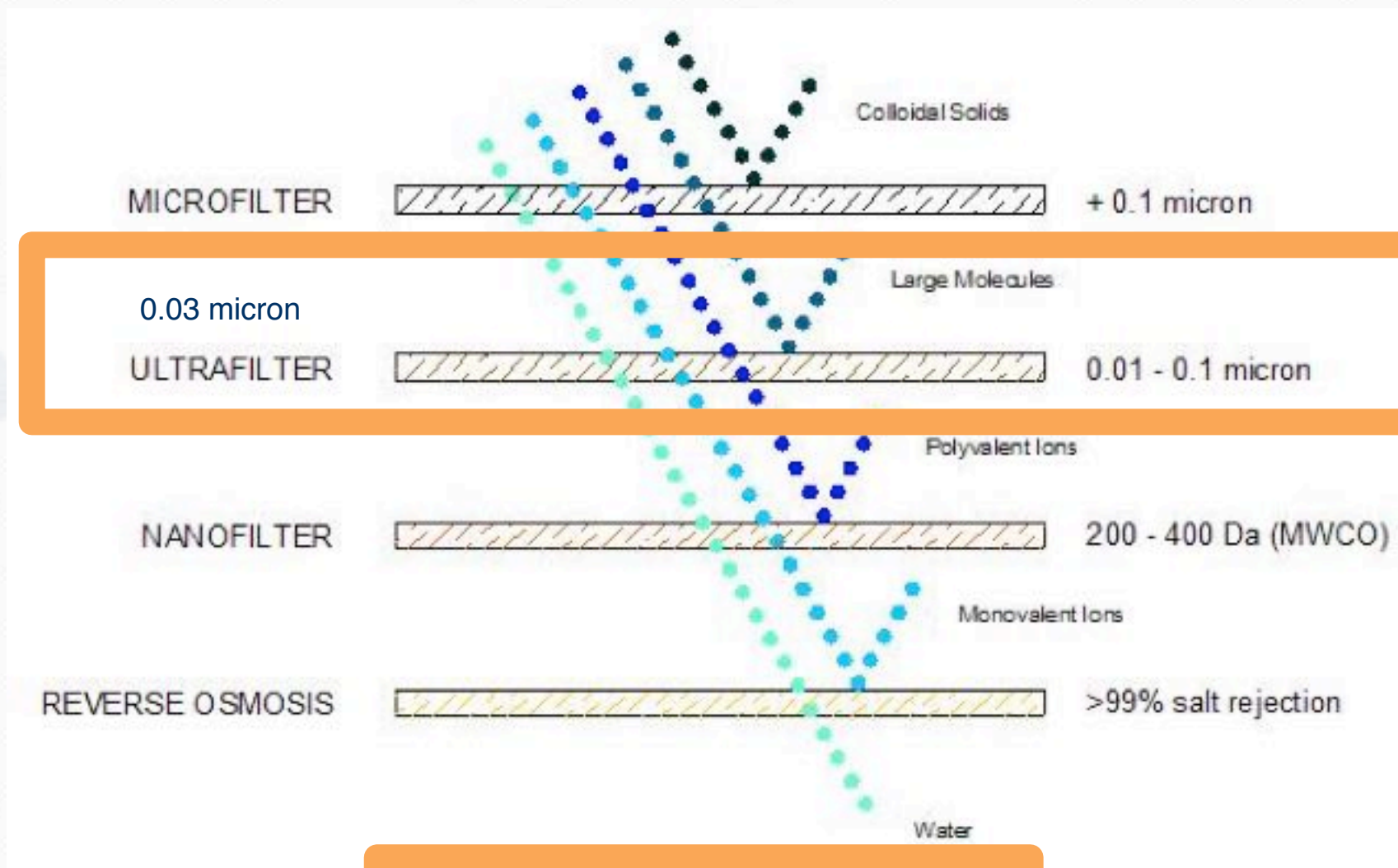


# miniMBR™ UF Membrane Technology

0.03 micron Ultrafilter



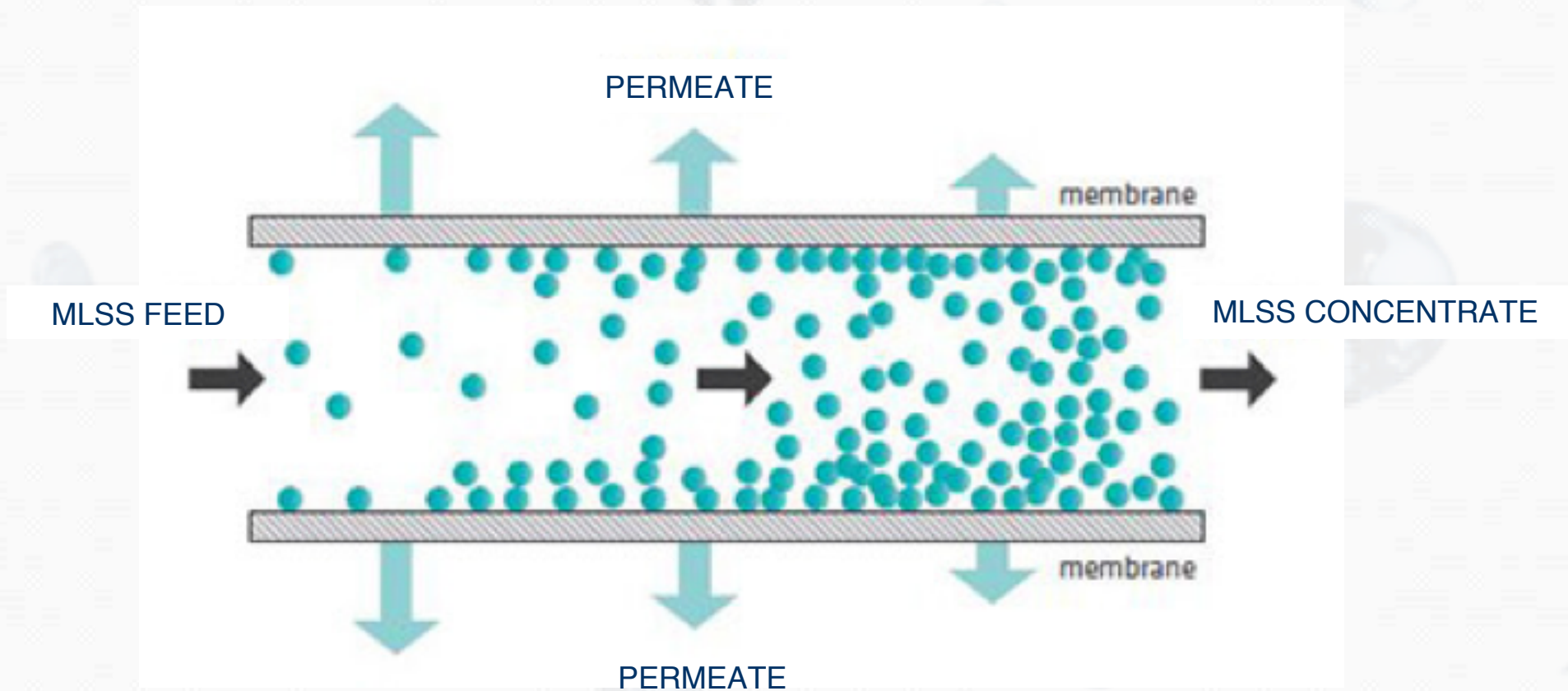
# miniMBR™ UF Membrane Technology



6-Log Bacterial Barrier  
4-Log Virus Barrier



# miniMBR™ UF Membrane Technology



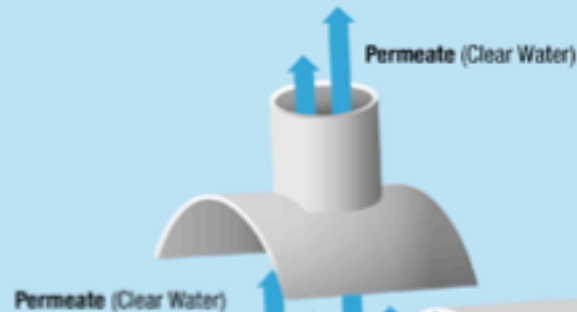
# miniMBR<sup>®</sup> UF Membrane Technology

0.03 micron  
Tubular  
PVDF UltraFilter

**Feed Stream:**  
- Water  
- Suspended Solids  
- Microorganisms

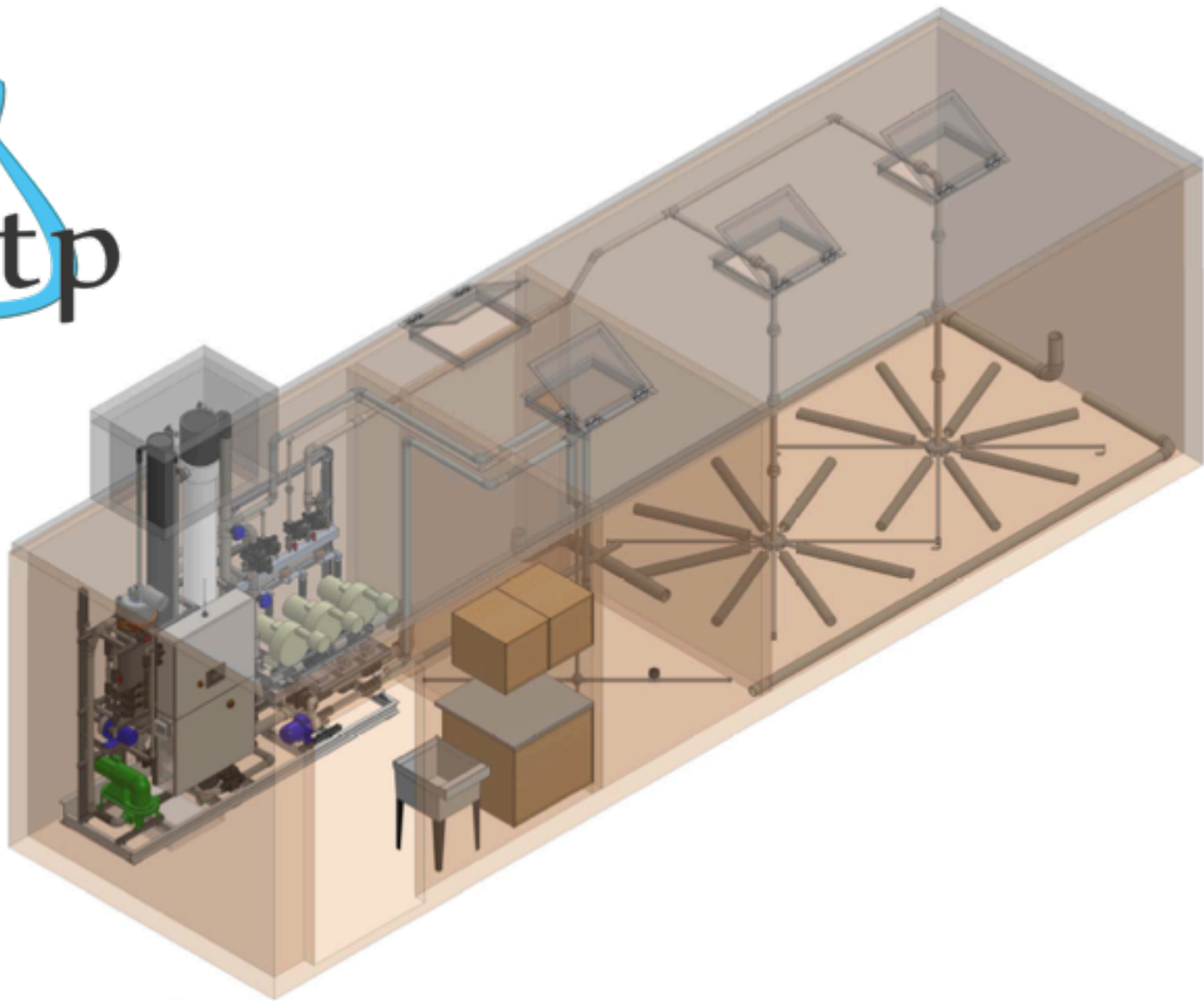


Semi-Permeable  
UF Membrane



**Retentate:**  
- Water  
- Suspended Solids  
- Microorganisms

**Tubular Membrane Configuration**



**ITP miniMBR<sup>®</sup> Package Plant, Single Membrane System**  
(3,000 gpd - 15,000 gpd)

# miniMBR<sup>®</sup> Package Plant @ Gerstell Academy Finksburg, MD





# miniMBR<sup>®</sup> Package Plant @ Gerstell Academy



# miniMBR<sup>®</sup> Package Plant @ Gerstell Academy



# miniMBR® Package Plant @ Gerstell Academy

## RAW SEWAGE CONDITIONS

ANALYSIS	METHOD	ANALYSIS DATE/TIME	BY	RESULT	Qual	REPORTING LIMIT
<b>Alkalinity SM2320B by Enviro-Chem</b>						
\$ Alkalinity as CaCO <sub>3</sub>	SM 2320B	06/08/17 17:00	SES	578 mg/L		10.0
<b>Chemical Oxygen Demand by EPA 410.4 by Enviro-Chem</b>						
\$ COD	EPA 410.4	06/02/17 14:15	KSN	602 mg/L		20.0
<b>Wet Chemistry by Enviro-Chem</b>						
\$ Ammonia Nitrogen	EPA 350.1	06/02/17 16:41	KSN	139 mg/L		1.00
\$ BOD, 5 Day	SM 5210B	06/06/17 15:30	RPD	249 mg/L		120
Start time: 01-Jun-17 15:00						
\$ Kjeldahl Nitrogen	EPA 351.2	06/02/17 15:32	KSN	148 mg/L		4.0
# Nitrate (as N)	EPA 300.0	06/01/17 19:30	WND	< 0.2 mg/L		0.2
\$ Phosphorus, P	EPA 365.1	06/06/17 12:04	KSN	14.3 mg/L		1.25
\$ Suspended Solids	SM 2540D	06/06/17 20:45	SES	222 mg/L		10.0



# miniMBR® Package Plant @ Gerstell Academy

## TREATED EFFLUENT RESULTS

DMR Laboratory Effluent Results @ Gerstell Academy

2018	BOD	TSS	Ammonia	TKN	Nitrate + Nitrite	GPD (ave.)
January	<2	<1	<0.2	0.6	4.6	1221
February	<4	<1	<0.2	0.7	2.0	1465
March	<2	<1	<0.2	<0.5	3.8	848
April	<2	<1	<0.2	<0.5	7.4	1357
May	<2	<1	<0.2	0.7	8.1	1396
June	<2	<1	<0.2	0.7	1.3	899
July	<2	<1	<0.2	<0.5	4.0	568
average	<2	<1	<0.2	<0.6	4.5	1108



# miniMBR<sup>®</sup> Component Plant @ Camp Fretterd National Guard Base Reisterstown, Maryland

## Raw Sewage Conditions

ANALYSIS	METHOD	ANALYSIS DATE/TIME	BY	RESULT	Qual	REPORTING LIMIT
<b>Alkalinity SM2320B by Enviro-Chem</b>						
Alkalinity as CaCO <sub>3</sub>	SM 2320B	05/28/19 12:30	FRD	476 mg/L		4.0
<b>Biochemical Oxygen Demand SM 5210B by Enviro-Chem</b>						
BOD, 5 Day	SM 5210B	05/29/19 15:41	BMG	216 mg/L		120
Start time: 24-May-19 16:00						
<b>Chemical Oxygen Demand by EPA 410.4 by Enviro-Chem</b>						
COD	EPA 410.4	05/24/19 15:05	BMG	460 mg/L		20.0
<b>Wet Chemistry by Enviro-Chem</b>						
Ammonia Nitrogen	EPA 350.1	05/28/19 10:32	FRD	100 mg/L		5.00
Kjeldahl Nitrogen	EPA 351.2	05/24/19 14:30	FRD	122 mg/L		10.0
Nitrate (as N)	EPA 300.0	05/23/19 21:18	SES	< 0.2 mg/L		0.2
Nitrite (as N)	EPA 300.0	05/23/19 21:18	SES	< 0.2 mg/L		0.2
Phosphorus, P	EPA 365.1	05/24/19 14:31	FRD	11.4 mg/L		1.25
Suspended Solids	SM 2540D	05/28/19 11:16	FRD	52.0 mg/L		10.0
Total Nitrogen	Calculation	05/24/19 14:30	SES	122 mg/L		10.4

# miniMBR<sup>®</sup> Component Plant @ Camp Fretterd National Guard Base

## Treated Effluent Results

ANALYSIS	METHOD	ANALYSIS DATE/TIME	BY	RESULT	Qual	REPORTING LIMIT
<b>Alkalinity SM2320B by Enviro-Chem</b>						
Alkalinity as CaCO <sub>3</sub>	SM 2320B	05/28/19 12:30	FRD	333 mg/L		4.0
<b>Biochemical Oxygen Demand SM 5210B by Enviro-Chem</b>						
BOD, 5 Day	SM 5210B	05/29/19 15:41	BMG	< 5.0 mg/L		5.0
Start time: 24-May-19 16:00						
<b>Chemical Oxygen Demand by EPA 410.4 by Enviro-Chem</b>						
COD	EPA 410.4	05/24/19 15:05	BMG	22.0 mg/L		20.0
<b>Wet Chemistry by Enviro-Chem</b>						
Ammonia Nitrogen	EPA 350.1	05/28/19 10:19	FRD	< 0.10 mg/L		0.10
Kjeldahl Nitrogen	EPA 351.2	05/24/19 14:32	FRD	1.3 mg/L		0.4
Nitrate (as N)	EPA 300.0	05/23/19 21:36	SES	0.5 mg/L		0.2
Nitrite (as N)	EPA 300.0	05/23/19 21:36	SES	< 0.2 mg/L		0.2
Phosphorus, P	EPA 365.1	05/24/19 14:32	FRD	0.08 mg/L		0.05
Suspended Solids	SM 2540D	05/28/19 11:18	FRD	< 1.0 mg/L		1.0
Total Nitrogen	Calculation	05/24/19 14:32	SES	1.81 mg/L		0.800

# miniMBR<sup>®</sup> Component Plant @ Camp Fretterd National Guard Base

## Treated Effluent Results

### FINAL REPORT OF ANALYSIS

Innovative Treatment Products LLC  
11 Easter Ct  
Owings Mills, MD 21117

PROJECT NAME: Camp Fretterd  
REPORT DATE: 05/29/2019  
REPORT NBR: 190529144138

LAB#: E058757-01      SAMPLE ID: Effluent Pre UV  
LOCATION: Camp Fretterd WWTP  
DATE SAMPLED: 05/22/2019      TIME SAMPLED: 1:08PM      SAMPLER- S Shelley  
DATE RECEIVED: 05/22/2019      TIME RECEIVED: 1:30PM  
DELIVERED BY: Stephen Shelley      RECEIVED BY: Ginny Shelley

COMMENTS:

COMMENTS:

ANALYSIS	METHOD	ANALYSIS DATE/TIME	BY	RESULT	Qual	REPORTING LIMIT
<b>Microbiology by Enviro-Chem</b>						
Fecal Coliform	IDEXX Colilert	05/22/19 15:15	VPS	< 1.0 MPN/100 mL		1.0



# ITP's miniMBR® Conclusions

- Provides effective and power-efficient treatment of sanitary wastewater
- Affords efficient *enhanced denitrification and phosphorous removal* to minimize nutrients discharged to the Chesapeake Bay watershed.
- UF membrane *eliminates pathogenic bacteria and virus* from discharged water
- Totally enclosed system *eliminates noise and odors* for the neighboring community







# **THANK YOU**

## **Questions?**

**Proudly Developed & Assembled in Maryland, USA**  
**Innovative Treatment Products, LLC**  
**1 (800) 881 5184**  
**[www.innovatreat.com](http://www.innovatreat.com)**